



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
PATENT APPLICATION**

Appl. No. : 10/749,416
Applicant : Kendall S. Wills et al.
Filed : December 31, 2003
TC/A.U. : 2863
Examiner : Bui, Bryan

Confirmation No. 9565

Docket No. : TI-37082
Customer No. : 23494

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

CERTIFICATE OF MAILING OR TRANSMISSION

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9-2-2005
Jackie McBride
Jackie McBride

DECLARATION UNDER 37 C.F.R. 1.131

Sir:

KENDALL S. WILLS, KARTIK RANAMUJACHAR and MICHAEL D. DOCKINS declare as follows:

1. THAT they are the applicants in the subject application for Letters Patent;
2. THAT they conceived the invention as set forth in the attached invention disclosure, the attached paper entitled Wavelet Analysis of One or More Time Domain Reflectometry (TDR) Signals to Determine One or More Characteristics of One or More Anomalies in a Wire and in the subject application for Letters Patent in the United States prior to May 12, 2003 and continually worked on the subject

invention up to their reduction to practice as well as up to the filing of the provisional application Serial No. 60/486,663, filed July 11, 2003, all in the United States;

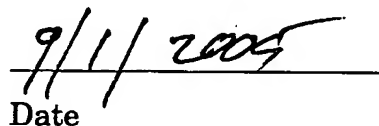
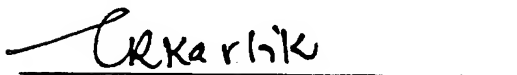
3. THAT they reduced the invention to practice as disclosed in the subject application in the United States prior to May 12, 2003;

4. THAT all redacted dates on the attached page(s) of the laboratory notebook are prior to May 12, 2003.

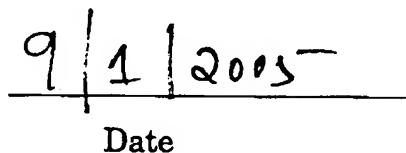
I declare under penalty of perjury that the above stated facts are true and correct on information and belief.



Kendall S. Wills


Date

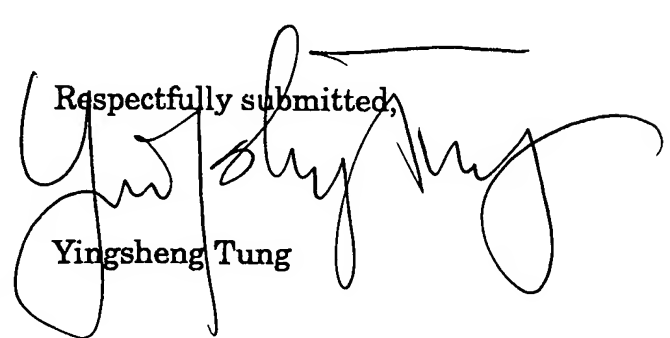
Kartik Ramanujachar


Date
Michael D. Dockins
Date

Texas Instruments Incorporated

TI-37082 - 2

Respectfully submitted,


Yingsheng Tung

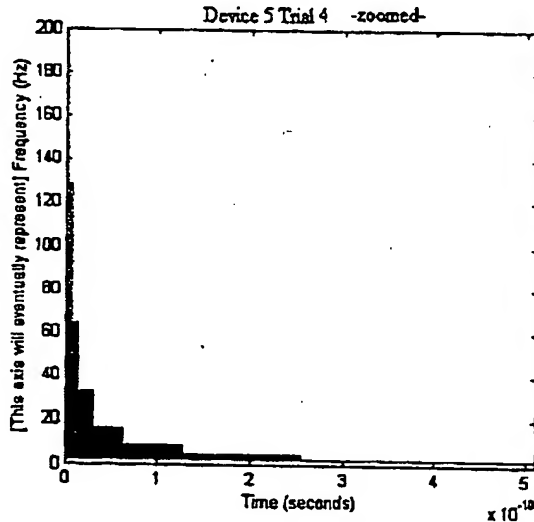
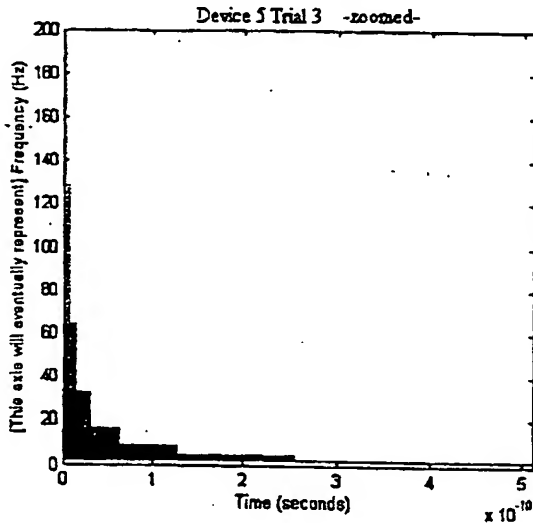
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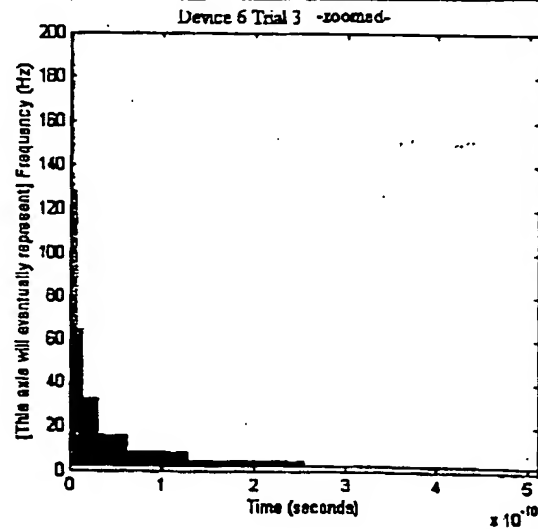
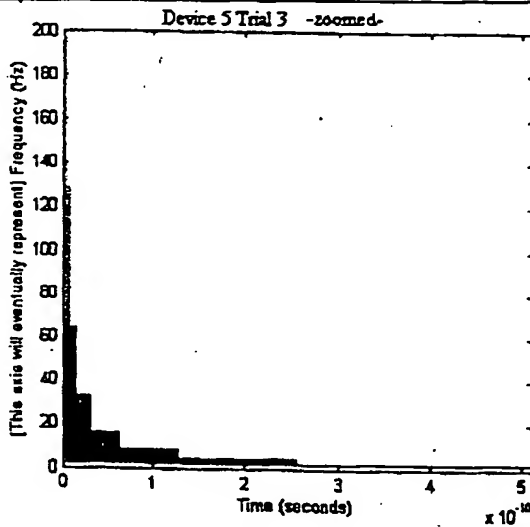
PROJECT NAME FDA TDRSNOTEBOOK NO. 1DAVB 4 ANALYSIS

THE WT USING THE DAUBCHIES WAVELET WAS TESTED ON TWO TRIALS OF UNIT 5 (NO DIE OR BUMPS). THE RESULTS WERE VISUALLY SIMILAR. THE WT(DAUB) IS REPEATABLE FOR TDR SIGNALS



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THE WT(DAUB) WAS ALSO USED IN TWO SIMILAR UNITS (5/6) w/ BOTH DIE & BUMPS REMOVED. THE RESULTS WERE VISUALLY SIMILAR. THE WT(DAUB) IS CONSISTENT



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DATE 7/1 19

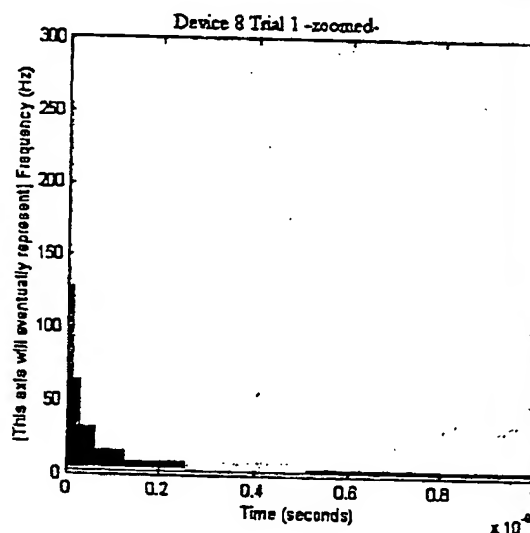
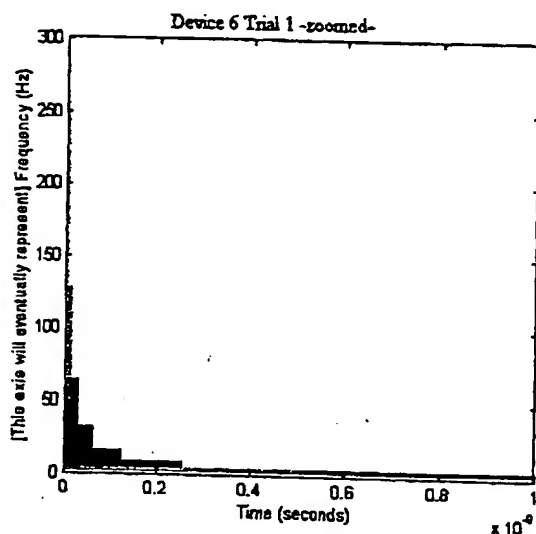
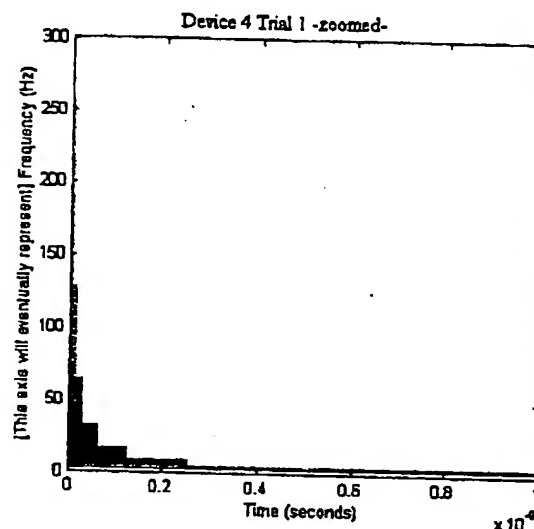
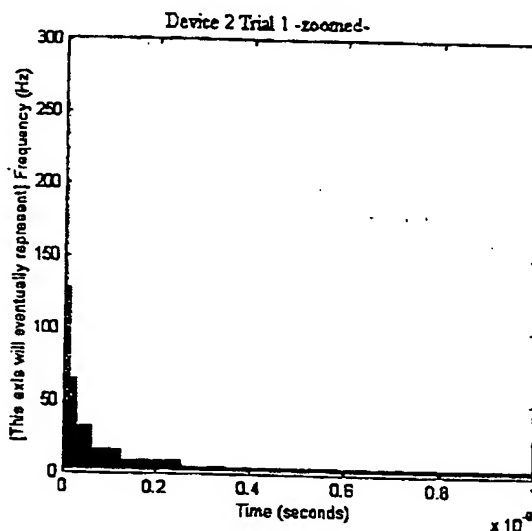
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PROJECT NAME FDADRS

NOTEBOOK NO. _____

THE WT (DABY) WAS THEN USED ON UNITS IN
ALL FOUR PREPARED STATES
U2H, U4H, U6H, U8H



WT Using D4 Wavelets for Four Dissimilar Units

THE WT (DABY) SHOWS PROGRESSION, BUT IT
IS FAR LESS NOTICABLE THAN IN THE
HAAR WT.

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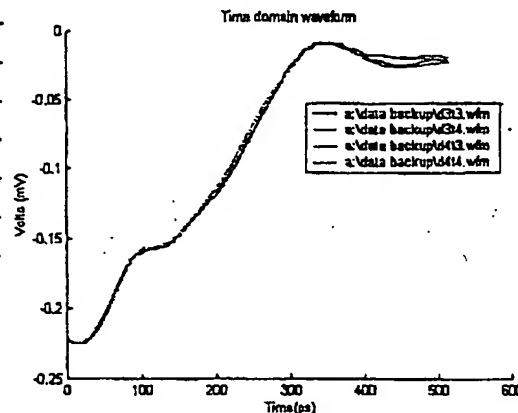
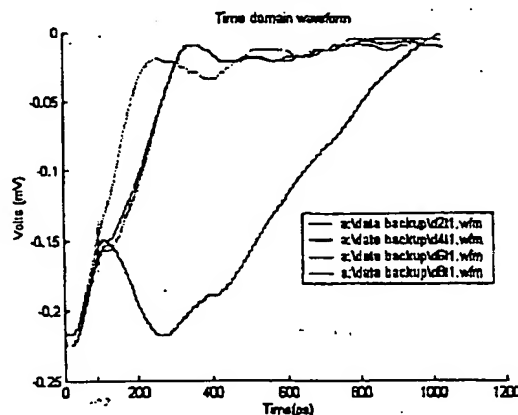
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PROJECT NAME

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NOTEBOOK NO. 1

WT(HAAR) ANALYSIS



FROM 20-80 PS, THE TDR WAVEFORMS ARE IDENTICAL. THE INITIAL VOLTAGE DIP AT THE BEGINNING OF THE TDR SIGNAL IS THE RESULT PRIMARILY OF THE PROBE TIP CONTACTING THE UNIT.

AFTER THIS POINT, THERE ARE DIFFERENCES BETWEEN THE DEVICES, BUT THEY ARE VERY SLIGHT AND DIFFICULT TO INTERPRET, ESPECIALLY FOR UNITS WHOSE CIRCUIT PATHS ARE NEARLY THE SAME LENGTH.

A TECHNIQUE THAT WOULD EMPHASIZE THE DIFFERENCES WOULD AID COMPARATIVE TDR GREATLY AND COULD HELP BETTER ISOLATE DEFECTS.

WAVELET ANALYSIS, ESPECIALLY USING HAAR WAVELETS, CAN BE USED TO HELP HIGHLIGHT THE DIFFERENCES. BECAUSE THE HIGH FREQUENCIES WHICH ARE ASSOCIATED WITH THE FAST CHANGES OF THE WAVEFORM CAN BE COMPARED BETWEEN UNITS TO DETERMINE IF THEY EXHIBIT SIMILAR CHANGES.

THE HAAR WT IS ALSO VERY USEFUL AT IDENTIFYING THE RESISTIVE (FLAT TDR SIGNAL) AREAS IN THE SIGNAL. THESE AREAS EXHIBIT ONLY LOW FREQUENCIES AND CAN BE EASILY IDENTIFIED USING THE HAAR WAVELET AS A BASIS.

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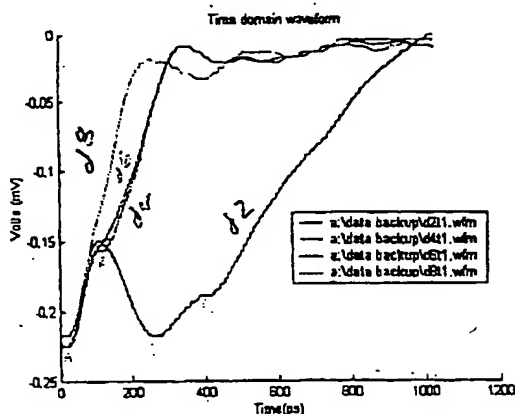
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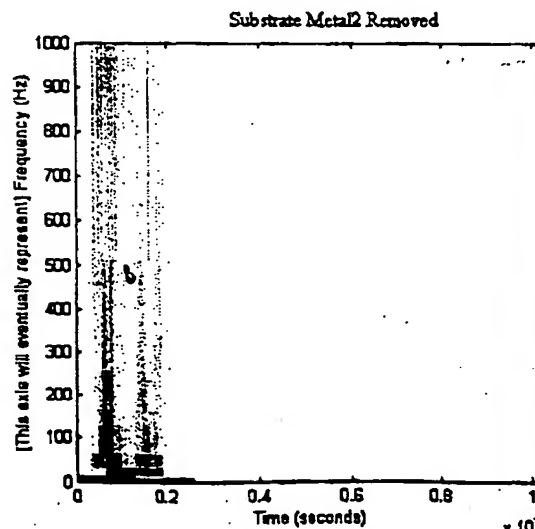
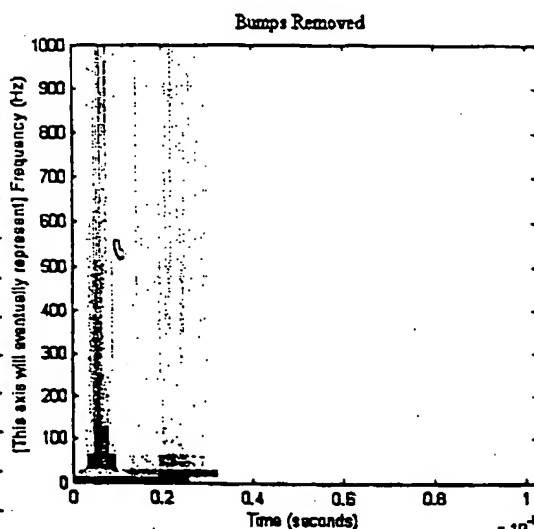
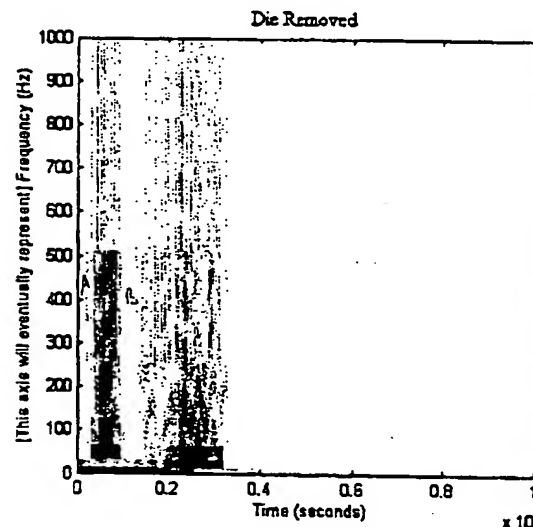
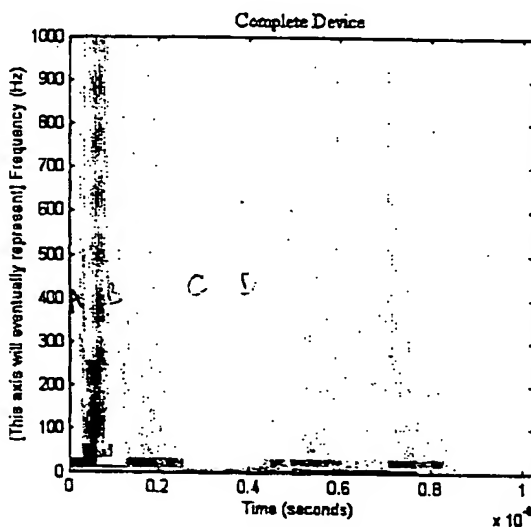
PROJECT NAME

EDATERS

NOTEBOOK NO. 1



SOME REGIONS OF INTEREST IN THE TIME DOMAIN WFM'S ARE LABELED. I FOCUSED MY EFFORTS ON REGION A, THE AREA WHERE THE WFM'S BEGAN TO EXHIBIT THEIR DIFFERENCES. WITH CARE SEE EASILY WITH THE HARP WAVELET THAT MORE & MORE HIGH FREQUENCY COMPONENTS ARE INTRODUCED AS THE ELECTRICAL PATH SHORTENS



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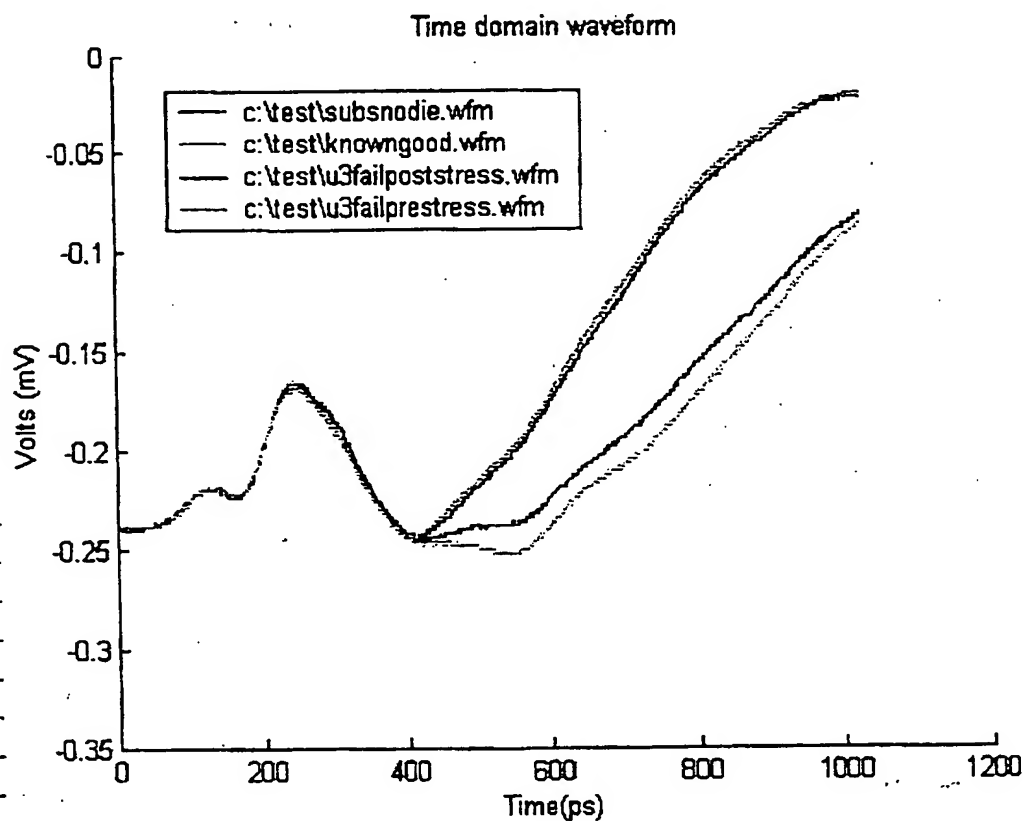
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PROJECT NAME FDATDESNOTEBOOK NO. 1

THE UT (HARR) WAS USED ON A SERIES OF TDR WAVEFORMS ACQUIRED BY OMAR DIAZ DE LEON FOR COMPARATIVE TDR. THE DEVICE ORIGINALLY SHOWED TO HAVE A FAILURE AT THE BUMP-TU-DIE INTERFACE.

AFTER STRESSING THE UNIT ELECTRICALLY THE UNIT RECOVERED & ITS NEW SIGNATURE RESEMBLED THAT OF A GOOD UNIT

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READ AND UNDERSTOOD

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DATE

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